



## LEGAL PROTECTIONS FOR THE USER OF THE IMMERSIVE TECHNOLOGY UNDER INDONESIAN LAW

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### ABSTRACT

The rapid advancement of immersive technologies, boosted by Artificial Intelligence, is revolutionizing industries such as education, healthcare, and commerce. These technologies create new forms of consumption that involve intensive data processing, virtual assets, and platform-controlled environments, raising urgent legal questions regarding consumer protection. This study examines whether Indonesia's current consumer protection legal framework is sufficient to protect consumers as users of immersive technology and to address emerging legal challenges and strategies arising from its use. The research adopts a normative legal research based on secondary data, focusing on statutory analysis of the Acts concerning Consumer Protection, Personal Data Protection, and the Electronic Information and Transactions, supported by legal doctrine and scholarly literature. Legal protection theory is employed as a normative benchmark to assess the sufficiency of the legal protection provided by existing regulations. The findings indicate that, although Indonesia's consumer protection framework provides basic legal safeguards, it has not been specifically structured to deal with immersive-technology risks, including data-driven and algorithmic practices, the legal treatment and loss of virtual assets, and consumer vulnerability in persistent, high-immersion digital environments. This condition demonstrates the legal urgency for regulatory refinement to ensure effective consumer protection while accommodating immersive technology innovation.

## A. INTRODUCTION

The rapid integration of immersive technologies into daily life has created a pressing challenge which is ensuring that legal frameworks can keep pace with technological innovation. This issue is also visible in Indonesia where both public and private sectors are actively driving the adoption of digital tools. For instance, the Connecting Immersive Experience (CIX) Summit 2024 highlighted a strong national commitment to advancing artificial intelligence and digital transformation.<sup>1</sup> This momentum is further mirrored in the private sector by local companies like Arutala, a Yogyakarta-based immersive technology company founded in 2019, specializes in VR, AR, and MR solutions, which specialized in deploying virtual and augmented reality solutions within education, focusing on integrating these technologies into education through collaborations with schools and universities to create innovative learning experiences.<sup>2</sup>

Immersive technologies generate highly interactive and lifelike environments that increasingly dissolve the distinction between physical reality and digital space.<sup>3</sup> In its development, Artificial Intelligence (AI) enhances these experiences by creating interactive applications that heighten user engagement and immersion, providing more realistic and motivating experiences compared to non-immersive alternatives.<sup>4</sup> The combination of AI and immersive technologies has transformative potential across various fields, including education, healthcare, and entertainment. For instance, AI-driven VR applications can significantly improve educational outcomes by providing personalized and interactive learning experiences.<sup>5</sup> In healthcare, AI and VR

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<sup>1</sup> Rahmatul Fajri, "Pameran Teknologi Imersif Pertama Di Indonesia, CIX Summit 2024 Tawarkan Pengalaman Menengok Masa Depan," *Media Indonesia*, 2024. <https://mediaindonesia.com/teknologi/660461/pameran-teknologi-imersif-pertama-di-indonesia-cix-summit-2024-tawarkan-pengalaman-menengok-masa-depan>. Accessed on June 21, 2025.

<sup>2</sup> Marsya Nabila, "Komitmen Arutala Percepat Implementasi Teknologi Imersif Untuk Bidang Edukasi," *DailySocial*, 2022. <https://dailysocial.id/post/komitmen-arutala-percepat-implementasi-teknologi-imersif-untuk-bidang-edukasi>. Accessed on June 21, 2025.

<sup>3</sup> Debabrata Datta, and Madhubrata Bhattacharya, "Development of Cognitive Intelligent Mechanism for Sustainability of Bigdata: A Future Shape of Metaverse," *Studies in Big Data 123* (2023): 1. See too, S. S. Thakur, Soma Bandyopadhyay, and Debabrata Datta, "Artificial Intelligence and the Metaverse: Present and Future Aspects," *Studies in Big Data 123* (2023): 171.

<sup>4</sup> Priyanka Datta, Amanpreet Kaur, Najla Sassi, Yonis Gulzar, and Wassim Jaziri, "An Evaluation of Intelligent and Immersive Digital Applications in Eliciting Cognitive States in Humans through the Utilization of Emotiv Insight," *MethodsX 12* (2024).

<sup>5</sup> Jasim Sharki Ghulam Al Balushi, Malak Ibrahim Ahmed Al Jabri, Suresh Palarimath, Pyingkodi Maran, K. Thenmozhi, and C. Balakumar, "Incorporating Artificial Intelligence Powered Immersive Realities to Improve Learning Using Virtual Reality (VR) and Augmented Reality (AR) Technology," In *Proceedings of the 3rd International Conference on Applied Artificial Intelligence and Computing (ICAAIC 2024)*, 2024. See too, Ling Ma, Wei Zhang, Manjin Lv, and Jingning Li, "The Study of Immersive Physiology Courses Based on Intelligent Network through

can offer innovative treatment methods, such as immersive therapy for autism.<sup>6</sup>

Immersive technologies are also central to emerging digital ecosystems like the metaverse, a vast and interactive virtual world. The metaverse, a convergence of digital realities, is transforming how individuals interact, communicate, and conduct commerce. The idea of the metaverse first appeared in *Snow Crash* by Neal Stephenson,<sup>7</sup> but today it has moved beyond fiction into reality, offering a virtual world where individuals can own, trade, and interact with virtual assets.

Virtual assets like Non-Fungible Tokens (NFTs) are often purchased using cryptocurrencies, and their ownership is certified through NFTs metadata and blockchain technologies, giving them tangible value despite their intangible nature. Ethereum is the most commonly used cryptocurrency for these transactions, but others like Tezos and Solana are also used.<sup>8</sup> For instance, virtual land has been sold in platforms like Decentraland, The Sandbox, and TCG World for millions of dollars. Studies such as those by Mariotti<sup>9</sup> and Pandey<sup>10</sup> suggest that the value of virtual goods in the metaverse will continue to rise as more businesses and individuals migrate to these digital spaces for various forms of interaction and commerce.

The metaverse is growing rapidly, encompassing everything from education, manufacturing, healthcare, and real estate. The shift from traditional online platforms to dynamic, sensory-rich environments offers new ways for social interaction and economic activities, including a novel way to interact with digital products and services.<sup>11</sup> However, it also presents a range of legal complexities that challenge established consumer protections law such

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Virtual Reality Technology in the Context of 5G," *Computational Intelligence and Neuroscience* 2022 (2022): 78.

<sup>6</sup> Xu Yuchen, "Application of Immersive Artificial Intelligence Based on Machine Vision in Education Management of Children with Autism," *International Journal of System Assurance Engineering and Management*, 2023.

<sup>7</sup> Neal Stephenson, *Snow Crash*, (New York: Bantam Books, 1992).

<sup>8</sup> Catherine Flick, "A Critical Professional Ethical Analysis of Non-Fungible Tokens (NFTs)," *Journal of Responsible Technology* 12, no. October (2022). See too, HHo, K.-H., M. Law, Y. Hou, and T.-T. Chan, "Spillover Analysis on NFTs, NFT-Affiliated Tokens and NFT Submarkets," *Finance Research Letters* 60 (2024); K Thenjono, F Ratana, and S P Hendratno, "The Business Prospect in Metaverse and NFT Era (User, Accountant, and Gaming Community Perspectives)," in *2022 4th International Conference on Cybernetics and Intelligent System, ICORIS 2022*, 2022.

<sup>9</sup> Tony Mariotti, "Metaverse Real Estate Statistics (2023)," *RubyHome: Luxury Real Estate*, 2022, <https://www.rubyhome.com/blog/metaverse-real-estate-stats/>. Accessed on June 21, 2025.

<sup>10</sup> Kamya Pandey, "Top 5 Most Expensive Virtual Land Sales Ever Made," *Jumpstart*, 2022, <https://www.jumpstartmag.com/top-5-most-expensive-virtual-land-sales-ever-made/>. Accessed on June 21, 2025.

<sup>11</sup> M. Tukur, J. Schneider, M. Househ, A. H. Dokoro, U. I. Ismail, M. Dawaki, and M. Agus, "The Metaverse Digital Environments: A Scoping Review of the Techniques, Technologies, and Applications," *Journal of King Saud University Computer and Information Sciences* 36, no. 2 (2024): 3332.

as Indonesian Consumer Protection Law Number 8 of 1999 (hereinafter as abbreviated as Consumer Protection Act), prompting a need to reconsider how current legal frameworks align with this new digital landscape.

These immersive tools can create substantial power disparities between companies and consumers as it shape consumer behavior through elements like search engine biases and interface design, which may lead to subtle yet pervasive manipulation. This raises concerns regarding consumer autonomy and questions the sufficiency of current consumer protections.<sup>12</sup> Furthermore, Dragono, Widiarty, and Nainggolan argue that while virtual assets meet several characteristics of tangible property under the Indonesian Civil Code (*KUHPerdata*), they remain inadequately regulated due to the complexities associated with digital ownership.<sup>13</sup>

Alongside the complexities of virtual asset ownership, data privacy has become a pressing concern in immersive technology. Rachmat Adiaz Arrofi et al. observe that although the metaverse provides enriched and interactive user experiences, it simultaneously generates serious privacy risks arising from the large-scale collection of personal and behavioral data. In addition, the metaverse environment is exposed to substantial data-security vulnerabilities, as its digital infrastructure remains susceptible to cyberattacks, including hacking and identity theft.<sup>14</sup> Indonesia's Law Number 27 of 2022 on Data Protection provides a foundation for protecting personal data, but the nature of these technologies challenges conventional approaches to consumer protection and data protection, underscoring the need for more robust and specific regulations tailored to immersive environments.

This research is focused on addressing legal problems arising from the interaction between user and immersive technology as explained above. Therefore, the legal problems examined in this article consist of two issues: (1) Is Indonesia's current legal framework normatively sufficient to protect consumers as users of immersive technology? (2) What are the legal challenges and regulatory strategies relevant to ensuring the consumer protection in immersive technology platforms?.

## B. RESEARCH METHODS

This study adopted a normative research to examine whether current Indonesian law is normatively sufficient to provide protection towards

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<sup>12</sup> E. Mik, "The Erosion of Autonomy in Online Consumer Transactions," *Law, Innovation and Technology* 8, no. 1 (2016): 18.

<sup>13</sup> Thomas Dragono, Wiwik Sri Widiarty, and Bernard Nainggolan, "Perlindungan Aset Digital Dalam Dunia Metaverse Berdasarkan Hukum Nasional," *Jurnal Kewarganegaraan* 7, no. 1 (2023): 742.

<sup>14</sup> Adiaz Arrofi, Rachmat, Rahman Ajie, Dziqra Ananda Hersya, and Tata Sutabri, "Metaverse Dan Implikasinya Pada Privasi Dan Keamanan Data Pengguna," *IJM: Indonesian Journal of Multidisciplinary* 2, no. 1 (2024): 89.

consumers of immersive technology as well as the legal challenges and regulatory strategies to ensure the consumer protection in this technology.<sup>15</sup> This method was selected because the legal problems addressed in this article relate to the adequacy and normative structure of existing laws, rather than to empirical patterns of enforcement or consumer behavior. The analysis focuses on statutory provisions of Consumer Protection Act, Data Protection Act, Electronic Information and Transaction Act, and Indonesian Civil Code. Furthermore, the Legal Protection Theory<sup>16</sup> has been used to evaluate whether existing laws provide sufficient preventive protection for consumers as users of immersive technology.

Secondary data were the main focus of the study. Act Number 8 of 1999 on Consumer Protection, Act Number 27 of 2022 on Data Protection, Act Number 11 of 2008 on Electronic Information and Transactions, as amended by Act Number 19 of 2016 and Act Number 1 of 2024, and the Indonesian Civil Code (*KUHPerdata*) were among the first primary legal materials, and the secondary legal sources were academic publications. Documentary study, or data collecting, entails reading and evaluating academic publications that are relevant to the research objectives. By using a qualitative approach to the study of the gathered data, legal concerns can be thoroughly examined using logical reasoning.

## C. DISCUSSION

### 1. Assessment of the Normative Sufficiency of Legal Protection for the Users as Consumers of Immersive Technology

#### a. Indonesian Regulations for Protecting Consumers in the Middle of the Immersive Technology Development

Regarding immersive technology, the legal connection between a consumer and a businessman often hinges on their respective roles as parties to a service or product agreement. In this relationship, the businessman acts as the provider or seller, and the consumer is the buyer or user. The businessman, or service provider, in immersive technology could range from software developers and hardware manufacturers to platform providers offering virtual or augmented experiences. Sometimes technological company also enter into collaboration with other company, institutions or any body entitled as its client to build the immersive technology.

The consumer interacts with the immersive technology as a user or participant, typically agreeing to terms of service before using the technology, such as those outlined in an End-User License Agreement (EULA). EULA

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<sup>15</sup> Fajar, Mukti, and Yulianto Achmad, *Dualisme Penelitian Hukum Normatif & Empiris*, (Yogyakarta: Pustaka Pelajar, 2023), 153–6.

<sup>16</sup> Phillipus M. Hadjon, *Perlindungan Hukum Bagi Rakyat Indonesina*, (Surabaya: PT Bina Ilmu, 1987), 2.

establishes the contractual relationship and power dynamics between virtual world participants and system owners, defining the terms of access and usage. It also regulates user behavior within the virtual environment, setting boundaries on permissible actions and content ownership.<sup>17</sup> Additionally, the EULA specifies legal recourse, detailing the application of real-world laws and potential sanctions.

Under Indonesian contract law, found in the Civil Code (*KUHPerdata*), a contract like EULA forms the primary basis for the legal relationship of consumers, participants or users and businesses or system owners. An agreement is a legally binding act between parties, like in this case between a company and a customer who consents to utilize immersive technology, as stated in Article 1313 of the Civil Code. As long as the contract satisfies the conditions outlined in Article 1320, namely, the parties' capacity, mutual consent, the agreement's subject matter, and legal cause, it becomes enforceable. Theoretically, the failure to fulfil the requirements will affect the validity of the contract and subject to be voidable or null and void. However, whether EULA of certain immersive technology-based legal relationship fulfil the requirements shall subject to practical issues and needs further in-depth legal research.

Current Legal Framework on the Act Number 8 of 1999 concerning Consumer Protection (Consumer Protection Act) applicable in the Immersive Technology Platforms. The Consumer Protection Act establishes a comprehensive set of rights and responsibilities for consumers and businesses, designed to protect individuals using various products and services, including immersive technologies like VR and AR.

Article 4 of the Consumer Protection Act establishes a comprehensive catalogue of fundamental consumer rights that form the normative foundation of consumer protection in Indonesia. The provision guarantees consumers the right to comfort, security, and safety in the consumption of goods and/or services, thereby emphasizing preventive protection against physical, psychological, and economic harm. It further affirms the right to choose goods and/or services and to obtain them in accordance with the promised value, conditions, and warranties, ensuring transactional fairness and contractual reliability.

The Act also safeguards consumers' right to accurate, clear, and honest information regarding the condition and guarantees of goods and/or services, reinforcing transparency as a central pillar of market integrity. In addition, consumers are entitled to have their opinions and complaints heard, to receive proper advocacy and access to dispute resolution mechanisms, and to obtain

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<sup>17</sup> O Torres-Hostench and C B Salinas, "Technology and E-Resources for Legal Translators: The LAW Ion Project," in *Conducting Research in Translation Technologies*, vol. 13, 2015, 289.

consumer education and guidance, reflecting both participatory and empowerment dimensions of protection. The provision further prohibits discriminatory treatment and guarantees the right to compensation, indemnification, or replacement where goods and/or services fail to conform to contractual agreements.

For users of immersive technologies, the normative implications of Article 4 extend beyond general product safety and require a heightened standard of transparency from business actors. Providers of Virtual Reality (VR), Augmented Reality (AR), and other immersive platforms must clearly communicate not only the technical specifications of their products, but also the potential risks inherent in prolonged or intensive use. Extended exposure to immersive environments may generate distinct physical effects, as well as psychological impacts. Under the consumer's right to safety, accurate information, and fair treatment, businesses therefore carry a legal obligation to disclose these risks in a clear, accessible, and comprehensible manner.

Failure to provide such transparent disclosure may undermine consumer autonomy and potentially constitute a violation of statutory rights, particularly where consumers are exposed to harms that were foreseeable yet insufficiently communicated. In this sense, Article 4 may be interpreted as imposing a preventive regulatory duty on immersive-technology providers to adopt safety-by-design principles and risk-mitigation strategies as part of their broader consumer protection responsibilities.

Article 7 defines the obligations of businesses, such as providing accurate information, maintaining and ensuring the quality of goods and/or services complies with applicable quality standards. This is particularly important for immersive technology companies, as it ensures that consumers receive exactly what was advertised or agreed upon, with no hidden flaws or unexpected discrepancies in the VR or AR experience. Article 8 prohibits businesses from failing to include information and/or usage instructions for goods in Indonesian as required by applicable laws. In the context of immersive technology, this means for example companies must avoid exaggerating their products' capabilities or making unsubstantiated claims about VR or AR experiences, as such misrepresentations could lead to dissatisfaction or even harm.

Article 19 addresses business operators are liable for compensating consumer damages, pollution, and/or losses from produced or traded goods/services. For immersive technology, this could hold businesses liable if their devices or software malfunctions, leading to physical injury, emotional distress, or other harm to users, thus reinforcing the need for high-quality and safe VR/AR products.

Even though Consumer Protection Act serves as the primary legal

framework for consumer protection, ensuring that consumers' rights are respected and protected, as more transactions move into the virtual space, the applicability of this law to virtual goods becomes questionable. Virtual assets are not specifically recognized by the current consumer protection legislation. Ruhtiani et al., emphasize the need for adapting consumer protection frameworks to the virtual economy, especially in ensuring that consumers have recourse in cases of fraud, unfair trade practices, or violations of digital ownership.<sup>18</sup>

Act Number 27 of 2022 concerning Personal Data Protection as Legal Framework for Immersive Technology Platforms. Data privacy is another critical issue concerning the protection of end-users as the consumer within immersive technology platforms, which gather enormous volumes of user data in order to produce customized and captivating virtual experiences. Personal Data Protection Act addresses general data privacy rights, providing consumers with safeguards for their personal information.

The Personal Data Protection Act establishes a structured framework for safeguarding personal data in Indonesia, covering every stage of data handling, from collection to processing and storage, with particular relevance to industries such as immersive technology where extensive data is often collected.<sup>19</sup> Article 19 divided the actors of Personal Data Controller and Personal Data Processor into three categories: any person; public person; and international organization. Article 1 number 7 defines that any person could be individual person or corporation, both acting as legal body or non-legal body. Thus, businesses providing services for the immersive technology products and/or services might fall under the scope as Data Privacy Controller and/or Data Privacy Processor.

Articles 7, 8, and 9 of the Personal Data Protection Act collectively affirm the central role of user autonomy in the processing of personal data. These Articles are crucial in the context of immersive technology, where extensive data is stored and processed. Article 7 guarantees the right of data subjects to access and obtain copies of their personal data, thereby promoting transparency and enabling users to verify how their information is collected and used. Article 8 strengthens this protection by granting the right to terminate processing and request deletion or destruction of personal data, introducing a corrective mechanism against excessive or indefinite data retention. Article 9 further reinforces individual control by recognizing the right to withdraw previously granted consent, ensuring that consent remains

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<sup>18</sup> Maya Ruhtiani, Yuris Tri Naili, Hesti Ayu Wahyuni, and Purwono, "Perlindungan Aset Digital Pada Era Metaverse Dalam Perspektif Hukum Positif Di Indonesia," *Literasi Hukum* 6, no. 2 (2022): 29.

<sup>19</sup> E A Henriksson, "Data Protection Challenges for Virtual Reality Applications," *Interactive Entertainment Law Review* 1, no. 1 (2018): 57.

revocable rather than absolute.

However, further interesting question arises when discussing about blockchain technology as it is known for its immutability.<sup>20</sup> Whether data stored in blockchain technology can be deleted or destroyed and therefore can fulfil the rights granted in the Articles. It is possible to suggest a normative change from viewing the right as the complete erasure of the data to viewing it as a right to cryptographic erasure.<sup>21</sup> Other legal-technical alternatives, such as permissioned blockchains, off-chain storage, and key deletion, can also be suggested.

Article 20 mandates that Personal Data Controller shall have the basis of data processing, one of them is "explicit consent" of the subject for the purposes of data processing. This requirement is especially important in the immersive technology sector as it may gather highly personal information, including behavioural patterns and even biometric data such as eye movement.<sup>22</sup> Biometric information is protected more strictly than general personal information under Article 4 since it is classified as Specific Personal Information. Specific Personal Data are those that, if processed, could have a more significant effect on the Personal Data Subject, such as discriminatory acts or more severe injuries. The law ensures that users have a clear understanding and choice over what and why the data is collected, which helps prevent unauthorized or exploitative use of personal information.

Electronic Information and Transaction Law Applicability in Immersive Technology Platforms. In order to protect consumers from potential risks associated with digital communications and the use of internet-based services, the Electronic Information and Transaction Law (EIT Law) establish a fundamental legislative framework for the protection of electronic data. The ITE Law places a strong focus on user consent and data privacy as two of its fundamental principles. Any organization that processes personal data in electronic transactions is required by Article 26 of the EIT Law amended by the Law Number 19 of 2016, to get the user's explicit consent. In immersive technology, where personal data collection and use are frequently inevitable, this criterion is essential.<sup>23</sup> By mandating consent, the EIT Law ensures that

<sup>20</sup> Joseph J. Bambara and Paul R. Allen, *Blockchain: A Practical Guide to Developing Business, Law and Technology Solutions*, Mc Graw Hill Education (New York: Mc Graw Hill Education, 2018), 6.

<sup>21</sup> Uni Tsulasi Putri, Irna Nurhayati, and Taufiq El Rahman, "Legal Challenges of the Application of the Right to Be Forgotten in Blockchain in Indonesia and the European Union," *Jambura Law Review* 7, no. 2 (2025): 633.

<sup>22</sup> L E Buck and B Bodenheimer, "Privacy and Personal Space: Addressing Interactions and Interaction Data as a Privacy Concern," in *Proceedings - 2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops, VRW 2021*, 2021, 399.

<sup>23</sup> Ruhtiani, Maya, Yuris Tri Naili, Hesti Ayu Wahyuni, and Purwono, "Perlindungan Aset Digital Pada Era Metaverse Dalam Perspektif Hukum Positif Di Indonesia," *Literasi Hukum* 6, no. 2 (2022): 32.

users have control over their data, including the ability to agree or decline the terms of data usage, and promotes transparency in how personal information is collected, stored, and utilized.

The Electronic Information and Transaction Law (EIT Law) as amended by Law Number 1 of 2024, which constitutes the second amendment to the EIT regime, further strengthens the legal framework applicable to immersive technology platforms as electronic system providers, particularly in relation to electronic contracts, platform obligations, and government intervention in the digital ecosystem. The revision of Article 17 Section (2a) establishes the idea of high-risk electronic transactions that must use electronic signatures guaranteed by electronic certificates, while also upholding the fundamental criteria of consent and personal data security in electronic transactions. The explanation of Article 17 Section (2a) mentions that high-risk electronic transactions include, among others, financial transactions that are not conducted through physical face-to-face interaction. Article 18A clarifies the binding force of international standard-form electronic contracts, which becomes highly relevant when VR/AR-based platforms facilitate significant financial transactions or complex in-world economic activities.

Additionally, the insertion of Article 40A gives the government the authority to order electronic system providers to make “adjustments” to their systems and/or take specific actions, such as limiting, adding, or even prohibiting certain features in Indonesia. This opens a regulatory avenue to require design changes, safety-by-design measures, or other remedial steps in immersive environments when their operation is deemed harmful or unfair to consumers. The government is also expressly mandated to foster a fair, accountable, secure, and innovative digital ecosystem.

The amendment of Article 16A also strengthens online child protection by imposing obligations on providers to indicate minimum age requirements, implement age-verification mechanisms, and provide reporting channels for misuse, which is particularly significant for immersive technology whose realistic and interactive nature may expose minors to heightened psychological and privacy risks, so that the preventive dimension of consumer protection in immersive platforms is normatively reinforced.

Nevertheless, despite these important enhancements, the EIT Law as revised by Law Number 1 of 2024 remains technologically neutral and does not yet provide detailed standards tailored to immersive-specific risks such as biometric profiling, persistent virtual worlds, and ownership of virtual assets, so that protection for users of immersive technology still largely depends on interpretation and general clauses rather than on explicit, sector-specific regulation.

b. Legal Protection Theory as the Benchmark for Assessing Consumer

### Protection

Legal protection theory distinguishes between preventive protection, which aims to prevent disputes and harm through prior regulation, supervision, information duties, and consent mechanisms, and repressive protection, which provides remedies, sanctions, and dispute resolution once violations or losses have occurred.<sup>24</sup> In Indonesia, both dimensions are normatively present in the consumer protection framework. A framework of preventive and repressive legal protection is conceptually already provided by Consumer Protection Act, which is applicable to immersive technologies like Virtual Reality (VR), Augmented Reality (AR), and metaverse platforms.

The CPA requires business actors to give truthful, accurate, and transparent information in a preventive manner (such as Article 4 number 3 and Article 7 letter b), and to ensure that goods and/or services meet safety and quality standards and are not misleadingly labeled or advertised (such as Article 7 letters d; Article 8). In the immersive-technology context, these obligations should be translated into, transparent disclosure, such as, about the capabilities and limitations of VR/AR systems, risks such as motion sickness or psychological impact, the nature and value of virtual goods, and the use of biometric and behavioral data embedded in immersive experiences.

In the repressive dimension, the CPA protects consumers after harm occurs through rights to compensation (such as Article 4 number 8; Article 19), access to dispute resolution (such as Articles 23, 45–48), and the possibility of administrative and criminal sanctions against non-compliant business actors (such as Articles 60 – 63). Applied to immersive technology, this means that consumers who suffer losses, for example, from defective headsets, misleading in-world offers, loss of virtual assets caused by the business' wrongful act, or unsafe immersive environments should, in principle, be able to claim refunds, replacements, or other indemnity and seek enforcement against platforms or providers who violate their obligations.

However, in relation to immersive technology, this framework is not yet sufficient and requires targeted amendment. The CPA was enacted in 1999 and does not expressly recognize digital content, virtual goods, or platform-based immersive services as distinct objects of consumer transactions, so the inclusion of VR/AR content, metaverse assets, or in-app purchases under "goods and/or services" remains interpretive rather than explicit. The Act also does not specifically address data-driven and algorithmic practices central to immersive environments, which can distort autonomy and choice but are not clearly framed as consumer-protection issues in the CPA. Existing safety provisions focus on traditional product risks and do not set clear

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<sup>24</sup> Phillipus M. Hadjon, *Perlindungan Hukum Bagi Rakyat Indonesia*, (Surabaya: PT Bina Ilmu, 1987), 2.

standards for immersive-specific harms such as cyber-sickness, psychological effects, risks to minors, spatial disorientation or for the safe design of virtual spaces. Liability allocation among platforms, app developers, and third-party sellers in complex immersive ecosystems is also unclear, complicating redress when virtual assets disappear, accounts are suspended, or in-world transactions fail. In addition, cross-border provision of immersive services and the need for scalable, digital dispute-resolution tools for high-volume, low-value virtual disputes are not yet addressed in a tailored way.

Some of issues above are partially regulated by the Personal Data Protection Act (PDP Act) and the Electronic Information and Transactions (EIT) Law, but these instruments do not fully replace the need to modernize the CPA. The PDP Act regulates personal data processing, including sensitive categories like biometric data, by setting rules on legal bases, consent, security, data-subject rights, and sanctions for misuse, which are highly relevant for immersive platforms that rely on biometric and behavioral tracking. The EIT Law addresses electronic systems, electronic contracts, online transactions, and some platform obligations, thereby covering the validity of in-app or in-world contracts, the duties of electronic system providers, and aspects of cross-border digital services. These regimes therefore already provide legal protection, especially regarding data privacy, cybersecurity, and the formal validity of electronic interactions in immersive environments.

Eventhough PDP Act and EIT Law regulate parts of the issues, they do not render the CPA amendments unnecessary. The PDP Act's core object is personal data, not the broader substantive fairness of consumer transactions, interface design, or contractual balance. A biometric privacy violation in an immersive environment is simultaneously a data-protection issue and a consumer-harm issue, and the CPA should explicitly recognize that PDP breaches can constitute violations of consumer rights to safety, information, and redress. Similarly, the EIT Law validates electronic contracts and regulates electronic systems, but it may not cover consumer-law questions such as whether standard metaverse terms are unfair, whether unilateral deletion of virtual assets or sudden account suspension is acceptable, or how liability should be distributed among multiple business actors in immersive ecosystems.

In current situation, protection remains fragmented, data misuse may be sanctionable under PDP, and system failures under EIT, and misleading immersive design, unsafe virtual product configurations, and unfair virtual-asset practices may only be indirectly addressed under Consumer Protection Act, if at all. Consequently, while the existing regulatory framework offers a baseline of legal protection, it is not yet adequate to comprehensively protect consumers in immersive technologies, making targeted amendments to the CPA necessary to explicitly cover digital and virtual goods, clarify

platform responsibilities, integrate PDP/EIT obligations, and ensure coherent, consumer-centred protection across immersive environments.

## **2. Legal Challenges and Regulatory Strategies for Ensuring the Consumer Protection in Immersive Technology**

### **a. The Legal Challenges of Consumer Protection in the context of Immersive Technology Platforms**

The legal recognition of digital ownership and virtual goods or asset is a nuanced and developing field. As digital assets become increasingly integrated into the economy, their treatment under property law and Intellectual Property (IP) rights has garnered significant attention from legal scholars and policymakers.

Digital assets, encompassing virtual goods, tokens, and other intangible digital products, are progressively gaining recognition as property within legal frameworks.<sup>25</sup> One might argue that this recognition aligns digital assets with traditional property, thus allowing them to be treated similarly to physical assets. This recognition expands property law protections, such as the possibility of using digital assets as loan collateral or protecting them from theft or fraud. Legal recognition of digital ownership not only legitimizes digital assets but also provides a framework for their secure transaction and management.

On the other hand, Subekti have mentioned the parameter of ownership rights of property: (1) provide the direct possession of the property; (2) maintainable towards every one; (3) "attachable" in nature, means the rights follow whenever the property is being transferred to other person (*droit de suite*); (4) the earlier rights prevail over the later rights.<sup>26</sup> Property rights can be divided into two categories: rights granted for enjoyment and rights granted for security.

The question then arises related to digital assets or virtual assets accessed in immersive technology, whether digital assets or virtual assets may subject to the aforementioned parameter. The parameter fulfillment will faces problem when the users or consumers do not entitled for full guarantee of access to the digital or virtual assets, for example if the technology is closed by the platform for certain reason. Virtual worlds differentiate between the ownership of digital content and the platforms that host them. This division

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<sup>25</sup> Napolitano, E. "The New Frontiers of Trust: Bitcoins and Cryptocurrencies," *Journal of Law, Market and Innovation* 3, no. 1 (2024): 33–60. See too, Jakub Wyczik, "The Rise of the Metaverse: Tethering Effect and Intellectual Property of Crypto Tokens," *Journal of Intellectual Property Law and Practice* 19, no. 4 (2024): 358.

<sup>26</sup> Subekti, *Pokok-Pokok Hukum Perdata*, (Jakarta: PT Intermasa, 2011), 87.

often leads to conflicts, as platforms typically retain significant control over digital assets, limiting the ownership rights of users and entrepreneurs.<sup>27</sup>

Users frequently form emotional connections with their virtual possessions despite not having legal ownership. This lack of legal control over digital items is problematic, as it prevents users from safeguarding or transferring their assets, highlighting a significant gap in user rights within virtual spaces.<sup>28</sup> Immersive virtual experiences can intensify users' psychological sense of ownership over digital items. However, this sense of ownership does not equate to legal rights, as platforms typically retain legal control, creating a disconnect between emotional and legal ownership.<sup>29</sup>

Another issue is on how to use the digital asset as collateral in Indonesia and therefore fulfill the parameter or property rights above. Based on Indonesian Security Law, the mechanism of security is governed in several regulation. First, pledge or *gadai* is commonly used for movable assets where physical possession of the asset is transferred to the creditor as collateral.<sup>30</sup> Article 1150 – 1160 of the Indonesian Civil Code govern the legal institution of pledge (*gadai*) as a form of collateral for movable assets, setting out the nature of the pledge, the position of the creditor, and the rules for enforcement and termination. Second, fiduciary transfer is a mechanism where movable assets (such as vehicles, machinery, inventory, or receivables) or certain intangible assets are used as collateral while possession remains with the borrower. It is regulated under the Act Number 42 of 1999 on Fiducia. This security interest is registered through the Fiducia Registration Office, giving the lender the right to reclaim and sell the asset in the event of a default.<sup>31</sup>

Third, mortgage or *hipotek* traditionally governed under Indonesian Civil Code article 1162 and applicable primarily to vessels or ships above a certain tonnage, other than land. Fourth, land mortgage rights governed under the Act Number 4 of 1996 on Land Mortgage, which is used specifically for land and buildings and grants a priority right to creditors if the borrower defaults. It is a registered form of collateral, giving the creditor legal assurance of claim over the property if obligations are not met. Fifth, corporate guarantee

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<sup>27</sup> M Zhou, M.A.A.M. Leenders, and L M Cong, "Ownership in the Virtual World and the Implications for Long-Term User Innovation Success," *Technovation* 78 (2018): 56.

<sup>28</sup> R Watkins and M Molesworth, "Attachment to Digital Virtual Possessions in Videogames," *Research in Consumer Behavior* 14 (2012): 153.

<sup>29</sup> Luangrath, A. W., J. Peck, W. Hedgcock, and Y. Xu, "Observing Product Touch: The Vicarious Haptic Effect in Digital Marketing and Virtual Reality," *Journal of Marketing Research* 59, no. 2 (2022): 308.

<sup>30</sup> Subekti, *Pokok-Pokok Hukum Perdata*, (Jakarta: PT Intermasa, 2011), 79.

<sup>31</sup> Ashibly, *Hukum Jaminan, MIH Unihaz* (Bengkulu, 2018), 95-8.

and/or personal guarantee which outlines the principles of suretyship (*bortoght*) is governed under Article 1820 – 1864 of Indonesian Civil Code.<sup>32</sup>

Assuming the digital or virtual assets is subject to fiducia mechanism of collateral, the next question is on how the legal relationship, its effect and technical mechanism would be constructed. This question requires broad analysis for another deep research in the future.

In addition to property rights, digital ownership involves layers of Intellectual Property (IP) considerations. Virtual goods do not merely constitute assets, they are often intertwined with intellectual property rights, encompassing copyright, licensing, and usage permissions. This multifaceted nature of virtual goods necessitates a comprehensive legal framework that can address copyright protection, enforce licensing agreements, and clarify the doctrine of first sale in digital contexts. As virtual goods become more economically valuable, robust IP regulations become essential to protect creators' rights and to support a thriving digital economy.<sup>33</sup>

Furthermore, blockchain technology has become a game-changing instrument for determining and transmitting digital asset ownership. Digital ownership may be verified with a high level of security and confidence by utilizing blockchain's transparency and immutability. Unlike traditional verification methods, blockchain's decentralized nature provides a reliable proof of ownership, which is particularly valuable in safeguarding digital assets. However, despite its potential, the application of blockchain for legal recognition of digital ownership is still experimental and requires further development to achieve widespread legal adoption.<sup>34</sup>

Furthermore, the decentralized nature of many immersive platforms poses additional challenges for data privacy enforcement. Platforms that operate across borders or use decentralized blockchain technology may store user data in various locations, making it difficult for Indonesian authorities to regulate and protect this data effectively. This jurisdictional complexity necessitates international collaboration or updated laws that account for the cross-border nature of digital data.

#### b. Strategies to Enhance the Consumer Protection in the Middle of Immersive Technology Development

<sup>32</sup> Satrio, J. *Hukum Jaminan, Hak-Hak Jaminan Pribadi Tentang Perjanjian Penanggungan Dan Perikatan Tanggung Menanggung*, (Jakarta: Citra Aditya Bakti, 1996), 89.

<sup>33</sup> Jakub Wyczik, "The Rise of the Metaverse: Tethering Effect and Intellectual Property of Crypto Tokens," *Journal of Intellectual Property Law and Practice* 19, no. 4 (2024): 358. See too, Deslaely Putranti and Uni Tsulasi Putri, "Enforcement of Copyright Law on Non-Fungible Token (NFT) Through Smart Contracts," *Kosmik Hukum* 24, no. 1 (2024): 49.

<sup>34</sup> Alsulaimani, S., F. Hussain, and O. Hussain, "Digital Asset Ownership Based on Blockchain: A Literature Review," In *Proceedings of the 2023 IEEE International Conference on e-Business Engineering (ICEBE 2023)*, 2023, 129.

Protecting consumer rights has become more crucial as immersive technology becomes more ingrained in many facets of daily life, from digital shopping places to travel and entertainment. In response to the legal challenges identified in the previous section including the lack of legal certainty over virtual assets, privacy risks, and platform accountability, several scholars have discussed on strategies and considerations that can be implemented across regulatory frameworks, government support, business practices, and technological adaptations.

A strong regulatory framework is essential to safeguard consumers engaging with immersive technology. To address the legal uncertainty surrounding digital content transactions and virtual asset ownership, one approach is the amendment of consumer protection law that can also adopt consumer rights interest in using immersive technology. For example, the consumer protection regulation can include protections specifically for digital content transactions, ensuring that consumers have clear rights, such as the right of withdrawal and access to remedies in cases of detriment.<sup>35</sup> In Indonesian context, the laws on consumer protection and data privacy can potentially be expanded to include such as the regulation of digital content transaction and digital ownership of assets.

Government support is also critical in creating an environment where consumer rights can be protected as immersive technology grows. Governments can enhance the adoption of immersive technology by establishing a favourable regulatory environment, providing financial support to encourage industry best practices, and investing in the necessary infrastructure.<sup>36</sup> These measures are particularly important in addressing broader regulatory gaps related to platform governance and cross-border digital services. Furthermore, addressing legal challenges within emerging platforms like the metaverse is paramount. Concerns including consumer protection, intellectual property rights, and data privacy must be proactively managed to ensure that the development of these platforms aligns with responsible, consumer-centric standards.<sup>37</sup>

In addition to regulatory and government measures, businesses themselves can help safeguard consumers' rights in the immersive digital sphere in addition to governmental and regulatory actions. Ensuring fair

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<sup>35</sup> D Bezáková, "The Consumer Rights Directive and Its Implications for Consumer Protection Regarding Intangible Digital Content," *Masaryk University Journal of Law and Technology* 7, no. 2 (2013): 177.

<sup>36</sup> Vasyuta, E., A. Davtyan, T. Podolskaya, N. Bryukhanova, and D. Ushakov, "Immersive Technologies in the National Strategy for Greening Tourism Activities," *BIO Web of Conferences* 116 (2024): 43.

<sup>37</sup> Banerjee, P., and G. Kaur. "Contemporary Challenges in Metaverse: A Techno-Legal Analysis." In *Lecture Notes in Networks and Systems* 1025, 2024, 231.

advertising practices is one such responsibility. When employing immersive technologies for marketing, businesses must be mindful of the legal and regulatory dangers to ensure that their advertising strategies are equitable and do not take advantage of customers.<sup>38</sup> Moreover, adopting consumer-centric policies that emphasize transparency and trust-building can enhance the consumer experience, reduce information asymmetry between platforms and users, and protecting consumer rights more effectively.<sup>39</sup> Technological adaptations that enhance the consumer experience while safeguarding rights and privacy are essential for promoting the responsible use of immersive technology. For instance, implementing privacy-focused technology solutions can help ensure that the deployment of immersive experiences does not compromise consumer data integrity.

In addition to the regulatory and business measures, engineering strategies can also strengthen consumer protection in immersive technology. Implementing privacy protection models, such as intrusion detection algorithms, can help safeguard consumer data during immersive experiences, especially within e-commerce environments where personal information is at higher risk of exposure.<sup>40</sup>

Consistent with Legal Protection Theory, which underscores the role of law in coordinating and safeguarding societal interests by regulating and prioritizing competing rights and responsibilities,<sup>41</sup> the development of consumer protection strategies in immersive technology must reflect a careful balance between innovation and consumer rights. These strategies are collectively to respond the legal challenges identified in this study by strengthening legal certainty over digital assets, enhancing data protection, improving platform accountability, and promoting transparent business practices. Regulatory frameworks should integrate protections that address the unique risks posed by immersive environments, ensuring clear rights over digital content and assets. Similarly, government policies and business practices must prioritize transparency, fairness, and trust-building, while technological adaptations safeguard privacy and data security. By grounding these approaches within the legal framework, the adoption and growth of

<sup>38</sup> Lobov, K. "Advertising and VR: Regulatory Challenges Ahead," *Interactive Entertainment Law Review* 1, no. 1 (2018): 56.

<sup>39</sup> S. Saxby, "The 2014 CLSR-LSPI Lisbon Seminar on 'The Digital Citizen' Presented at the 9th International Conference on Legal, Security and Privacy Issues in IT Law (LSPI), 15–17 October 2014; Vieira De Almeida & Associados, Lisbon, Portugal," *Computer Law and Security Review* 31, no. 2 (2015): 163.

<sup>40</sup> S. Zhuang, "E-Commerce Consumer Privacy Protection and Immersive Business Experience Simulation Based on Intrusion Detection Algorithms," *Entertainment Computing* 51 (2024).

<sup>41</sup> Satjipto Rahardjo, *Ilmu Hukum*, 7th ed. Edited by Awaludin Marwan, (Bandung: Citra Aditya Bakti, 2012), 53-56.

immersive technology can proceed responsibly, fostering consumer trust and ensuring that societal interests in innovation and protection are harmonized.

#### **D. CONCLUSION**

The rapid advancement of immersive technologies has transformed industries offering innovative solutions but also presenting significant legal challenges. While Indonesian laws like the Consumer Protection Act, Data Protection Act and Electronic Information and Transaction Law provide foundational safeguards, digital and virtual goods, data-driven design, and multi-actor platform responsibilities, making explicit recognition of virtual assets and stronger, consumer-centred protections necessary. To bridge these gaps, the regulatory framework should be modernized through targeted amendments to the Consumer Protection Act and systematic integration with PDP and EIT rules to explicitly recognize virtual assets and immersive services, clarify platform responsibilities, and ensure coherent, robust protections for consumers in virtual environments. Government support through favourable regulations and infrastructure investment is critical, while businesses should adopt transparent and consumer-centric practices. Technological advancements should prioritize data security and user privacy to foster trust and sustainability. Consistent with the Legal Protection Theory, a balanced approach integrating innovation and consumer rights is essential. Strengthening legal frameworks and ethical business practices will enable Indonesia to embrace immersive technologies responsibly while safeguarding consumer interests in this evolving digital landscape. This paper leaves gaps in areas such as the empirical research of the legal protection, legal recognition of digital ownership and cross-border enforcement of consumer rights. These areas require further scholarly investigation.

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